

**Notice of Allowability**

Application No.

09/647,994

Applicant(s)

SORENSEN, JENS JORREN

Examiner

Gregory J. Strimbu

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the tele. int. of 3/7/06.
2. ☒ The allowed claim(s) is/are 1-9, 12-14, 16-32 and 35-49.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 3/7/06.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John P. Shannon on March 7, 2006.

The application has been amended as follows:

In the title:

changed the title to --METHOD AND APPARATUS FOR MAKING AN ELONGATE SPINDLE MEMBER OF CHAIN LINKS FOR TRANSFER OF PRESSURE AND TENSILE LOADS--

In the abstract:

rewrote the abstract as follows:

--An elongate spindle member having rigidity and stability against pressure and tensile loads as well as bending and torsional loads is made by winding-up a plurality of mutually interlocking chain links (1, 12), during axial advancement of the chain links, into a helical winding (5, 16) by a winding guide (14). The elongate spindle member, formed by the helical winding, extends between two objects, one of which is connected with the winding guide (14). The first turn of the helical winding is connected with a coupling member for connection with the other of the two objects. The helical winding is

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formed by drivingly connecting the chain links to a rotatable driving device in the winding guide and retaining each chain link in engagement with neighboring links in the same turn as well as adjacent chain links in neighboring turns.--

In the specification:

page 1,

before the title inserted --TITLE OF THE INVENTION--

following line 2, but before line 3 inserted -- BRIEF SUMMARY OF THE INVENTION--

page 2,

line 32, changed "in the dependent claims" to --herein--

line 33, deleted "13 to 44"

following line 33, but before line 34 inserted -- BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS--

page 3,

following line 33, but before line 34 inserted -- DETAILED DESCRIPTION OF THE INVENTION--

In the claims:

rewrote the claims as follows:

1. A method of making at least one elongate spindle member having rigidity and stability against pressure and tensile loads as well as bending and torsional loads, whereby said spindle member acts between two objects, comprising the steps of:

- providing a plurality of mutually interlocking chain links (1, 12), said chain links each being formed with a substantially circular curvature on an exterior side sides thereof and including associated engagement means for mutual interlocking of the chain links,

- drivingly connecting said chain links to a rotatable driving device (3,4;15,26) arranged in at least one winding guide (14) connected with one of said two objects,

- operating said driving device to rotate ~~for rotation of~~ said chain links in said winding guide, said winding guide guiding said chain links to form ~~forming~~ at least one helical winding (5, 16) which forms ~~to form~~ said elongate spindle member and advancing said spindle member along a longitudinal axis thereof, wherein ~~so that~~ each of the chain links in said elongate spindle member is interconnected and retained in engagement by its associated engagement means with at least one neighboring chain link of said plurality of chain links in the same turn of said elongate spindle member as well as an adjacent chain link of said plurality of chain links in at least one neighboring turn of said elongate spindle member, and

- coupling the helical winding with the other of said two objects by a coupling member (6,18).

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2. A method according to claim 1, c h a r a c t e r i z e d by using a reversibly rotatable driving device (3,4; 15, 26) as said driving device to increase and reduce the length of the spindle member by rotation of said reversibly rotatable driving device in one and the other direction of rotation, respectively.

3. A method according to claim 2, c h a r a c t e r i z e d in that ~~the coupling by said~~ coupling member (6, 18) is connected ~~effected by connection~~ with the first produced turn of the helical winding.

4. A method according to claim 2, further comprising the steps of forming ~~a~~ act e r i z e d in that an additional elongate spindle member is ~~formed~~ concurrently with said at least one spindle member by using an additional plurality of chain links and an additional winding guide for guiding said additional plurality of chain links to form ~~means~~ for winding up an additional helical winding having a ~~with opposite~~ pitch direction opposite to a ~~with respect to the~~ pitch direction of said at least one helical winding, said additional winding guide being connected with the other of said two objects.

5. A method according to claim 43, c h a r a c t e r i z e d in that the two helical windings (57, 58) have the same diameter, said additional helical winding includes an additional coupling member, and said ~~that~~ coupling members (63, 64) ~~connected with the first produced turn (61, 62) of each winding~~ are connected with each other intermediate said two objects.

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6. A method according to claim 42, c h a r a c t e r i z e d in that one of said helical windings (67) is advanced inside the other of said helical windings (68) and said has chain links of said one of said helical windings are provided with an external threading (69) to engage an internal threading (70) in the chain links of the other helical winding to ~~enable each of said helical windings to function as a coupling member for the other~~ helical winding.

7. A method according to claim 2, c h a r a c t e r i z e d in that said a single spindle member device is formed by winding said plurality of mutually interlocking two separate sets of chain links (76, 77) with an additional plurality of interlocking chain links in alternating turns in said the same helical winding, both sets of chain links (72, 73) being supplied to the same winding guide.

8. A method according to claim 2, c h a r a c t e r i z e d by using the elongate spindle member to displace ~~method in a device for displacement of the two objects with respect to each other.~~

9. A method according to claim 2, wherein ~~c h a r a c t e r i z e d by using the method for opening and closing either of windows and doors, in which said two objects are constituted by a stationary frame structure and an openable sash structure and said method further comprises using said elongate spindle member to move said sash structure with respect to said frame structure.~~

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10. (canceled)

11. (canceled)

12. An apparatus for carrying out the method according to claim 1, comprising, in connection with said one of said two objects, a chain storage (10) having with an elongate chain (11) made of said plurality of mutually interlocking chain links (12) and having a guide means (13) for advancing the elongate chain (11) from said chain storage (10) to said at least one winding guide ~~means~~ (14), the at least one winding guide comprising a guide element (22) which engages ~~means comprising a guide (22)~~ ~~for engagement with~~ a guide member (34) on each of the chain links to wind ~~for winding~~ said at least one helical winding (16), said rotatable driving device (3 , 4; 15 , 26) being rotatably arranged in said winding guide ~~means~~ (14) for axial advancement of the spindle member ~~device~~ produced by the at least one helical winding (5) and the coupling member (6,18) ~~for coupling said at least one helical winding with the other of said two objects.~~

13. An apparatus according to claim 12, characterized in that said coupling member (6, 18) is connected with an end turn of the helical winding.

14. An apparatus according to claim 12, characterized in that the chain storage (10) comprises an elongate track connected with the advancing guide means (13), the elongate track for receiving the entire length of the chain (11) ~~in its entire length.~~

15. (canceled)

16. An apparatus according to claim 12, characterized in that the winding guide ~~means~~ (14) comprises a substantially part-cylindrical wall (21) having an interior supporting said, on the interior side of which a guide element (22) is provided for engagement with a guide member (34) on the chain links (12).

17. An apparatus according to claim 16, characterized in that said guide element comprises ~~is designed as~~ at least one thread-rib (22) having with a predetermined pitch across part of the interior ~~side of~~ said part-cylindrical wall (21).

18. An apparatus according to claim 17, characterized in that the advancing guide means (13) comprises a substantially linear guide rail (20) for controlled advancement of the chain links (12) towards the winding guide ~~means~~ and a guide surface (19,24) ~~for the exterior side (32) of the chain links, which guide surface is connected substantially in a tangential plane with the interior side of the part cylindrical wall (21) of the winding guide means, said guide surface (19, 24) having near its connection to said interior side~~ at least one advancing guide member (25).

19. An apparatus according to claim 18, characterized in that the advancing guide member (25) comprises a member protruding from the ~~advancing~~ guide surface (24) for introducing each said chain link (12) into the winding guide ~~means~~ (14) while



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axially displacing each said chain link with respect to said winding guidew~~with an axial displacement component.~~

20. An apparatus according to claim 16, characterized in that the driving device~~drive means~~ comprises an advancing wheel (26) including,~~which is provided in a~~ peripheral surface with a number of oblique teeth (27) having a predetermined ~~second~~ pitch directed opposite to a~~the~~ pitch of said guide element~~thread-rib~~ (22), said advancing wheel being journaled coaxially in the winding guide ~~means~~ (14) for engagement with the chain links (12) and being connected with a drive wheel (15) ~~coupled to drive means via a transmission.~~

21. An apparatus according to claim 13, characterized in that said coupling member (18) comprises~~is designed as~~ a substantially disc-shaped cover member with a substantially circular edge surface (51), in which a guide member (52) is provided for engagement with said guide element (22) in the winding guide ~~means~~ (14), and~~whereas~~ the cover member is provided, on one side surface (53), with protruding engagement elements~~means~~ (54) for engagement with ~~each their respective~~ ones of said chain links~~link~~ (12) in the end first~~turn~~ (17) of~~formed in~~ the helical winding (16).

22. An apparatus according to claim 21, characterized in that said protruding engagement elements~~means~~ (54) comprise~~comprises a hook~~ members~~member~~ (55).

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23. An apparatus according to claim 21, characterized in that said protruding engagement elements each means-(54) comprise ~~comprises~~-a groove (56).

24. An apparatus according to claim 21, characterized in that said guide member ~~in on~~-the edge surface (51) of the cover ~~coupling~~-member (48)-comprises a track (52) for receiving said guide element ~~thread-rib~~-(22) in the winding guide-means.

25. An apparatus according to claim 12, characterized in that the helical winding (5) ~~formed by the winding of the chain links (1)~~ is surrounded by a variable length casing (8)-of-variable-length.

26. An apparatus according to claim 25, characterized in that said casing is a bellows.

27. An apparatus according to claim 12, characterized in that an additional a chain storage, an advancing guide ~~means~~-and an additional winding guide ~~means~~-are provided in connection with the other ~~each~~-of said two objects for producing an additional ~~two~~-elongate spindle member ~~members~~-(57,58; 67, 68)-by winding-up-two helical-windings-with-opposite-pitch-directions.

28. An apparatus according to claim ~~claims~~-13, further comprising an additional helical winding including an additional coupling member wherein characterized in that

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the two helical windings (57, 58) have the same diameter and that said coupling  
members (63, 64) ~~connected with the first produced turn (61, 62) of each winding are~~  
connected with each other intermediate said two objects.

29. An apparatus according to claim 19, further comprising an additional helical winding wherein ~~characterized in that~~ one of said helical windings (67) is advanced inside the other of said helical windings (68) and said ~~has~~ chain links of said one of said helical windings are provided with an external threading (69) to engage an internal ~~threading (70) provided in~~ formed by said helical track in the interior side of the chain links of the other helical winding (68) to enable each of said helical windings to function as a coupling member for the other helical winding.

30. An apparatus according to claim 12, characterized in that said helical winding ~~a single spindle device (75) is formed by winding said comprising a helical winding of alternating turns of chain links (76,77) in alternating turns with additional chain linkssupplied from two separate sets of chain links.~~

31. A device ~~mutually displacing the height~~ for relative displacement of the two objects with respect to each other ~~comprising the~~ an apparatus according to claim 12.

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32. An operator device for opening and closing a window ~~windows or doors~~ comprising the an apparatus according to claim 12, ~~in which said two objects are constituted by a stationary frame structure and an openable sash structure.~~

33. (canceled)

34. (canceled)

35. An apparatus according to claim 12 wherein ~~elongate chain comprising interlocking chain links (12) with associated engagement means for use in an apparatus according to claim 12, characterized in that each said chain link (12) has a substantially circular curvature on exterior sides thereof and, in unfolded projection, substantially the shape of a parallelogram~~ shape with said engagement means comprising a first pair of engagement means (43, 44) for connection with at least one of said neighboring chain links link in the same turn of the helical winding provided at a first pair of opposite sides (28, 29) thereof and a second pair of further engagement means (49, 50) for engagement with a corresponding pair of said second pair of engagement means on one of said an adjacent chain links link in at least one neighboring turn of the helical winding provided at a second pair of opposite sides (30, 31) thereof.

36. An apparatus ~~A chain~~ according to claim 35, characterized in that each said guide member comprises chain link (12) is in its exterior side (32) formed with a track

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(34) adapted to receive said guide element ~~thread-rib (22)~~ in the winding guide means, ~~said track forming with said first pair of opposite sides (28, 29) an angle (v) adapted to said predetermined pitch.~~

37. An apparatus ~~A chain~~ according to claim 36, characterized in that an interior side (33) of each chain link (12) is formed with engagement means (45) for engagement with a ~~the~~ substantially linear guide rail (20) in the advancing guide means (13) and that said exterior side of each chain link (12) is provided with a second guide member (35) for introducing the chain links ~~link~~ (12) into the winding guide means (14) ~~with an orifice (38) of said track (34) orientated towards a first end (23) of said thread-rib (22), said orifice opening in the downstream side (28) of said first pair of opposite sides with respect to the direction of advancement.~~

38. An apparatus ~~A chain~~ according to claim 37, characterized in that each said second guide member (35) comprises a second track provided in said exterior side and ending in said first pair of opposite sides (28, 29) with ~~in~~ track orifices (36,37) ~~displaced in a direction parallel to said first pair of sides (28, 29).~~

39. An apparatus ~~A chain~~ according to claim 35, characterized in that a guide member (39) is formed in an interior side (33) of each chain link (12), each said guide member (39) comprising ~~being designed as~~ a helical track which ~~on the interior side of the helical winding (16) formed by the chain links forms a number of coherent helical~~

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tracks (42) with said second pitch for engagement with individual ones of the oblique teeth (27) of an the advancing wheel (26) of said driving device.

40. An apparatus A chain according to claim 37, characterized in that said guide rail engagement means (45) comprises one forms part of a third second pair of engagement means (45, 47) of each said chain link, each of said third pair of engagement means provided at said first pair of opposite sides (28, 29) of each said chain link and being brought into engagement with opposite means on neighboring links in the same turn (17) by the winding of the chain links, to retain the chain links (12) in their positions in said winding.

41. An apparatus A chain according to claim 35, characterized in that the first pair of engagement means for each chain link (12) comprises a hook-shaped hinge member (44) and a curved track (43) ~~for receiving said hinge member (44),~~ respectively, said curved tracks track (43) being adapted to receive a the hook member (55) of said coupling member (18).

42. An apparatus A chain according to claim 40, characterized in that said one of said third second pair of engagement means for each chain link (12) comprises a fork member (45) provided at a free edge of a wall portion defining one of said first pair of engagement means which comprises a said curved track (43), said fork member for engagement, on one hand, with said guide rail (20) in the advancing guide means (13)

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and, on the other hand, with the other one of said third pair of engagement means on said neighboring chain link, each said other one of said third pair of engagement means comprising a rib member (47) provided in an interior side of the other one of said first pair of engagement means which comprises a ~~said~~ hook-shaped hinge member (44), said fork and rib members (45, 47) preventing relative ~~mutual~~ displacement of said neighboring chain links in the same turn in the axial direction of the helical winding when engaged, each said ~~by engagement with a rib member (47) and a fork member (45), respectively, on each of respective neighboring chain links, the~~ hook-shaped hinge member (44) being provided, on each side of a respective one of said rib members member (47), with abutment surfaces (48a, 48b) serving as stops ~~a stop~~ for branches (45a) of a respective one of said fork members member (45) for retaining said neighboring chain links in a predetermined angular position in said turn.

43. An apparatus ~~A chain~~ according to claim 42, characterized in that said ~~mutually engaging~~ fork and rib members (45, 47) are positioned in such a way relative to one another that said curved tracks (43) of said on a chain links link (12) are brought into engagement with said hook-shaped hinge members (44) of said ~~in chain links~~ positioned ~~side by side~~ in the same turn and the ~~a~~ neighboring turn.

44. An apparatus ~~A chain~~ according to claim 35, characterized in that said second pair of further engagement means comprises a track (49) in the exterior side (32) of each of the chain links link (12) and a rib member (50) along one ~~side and the~~

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~~other, respectively, of said second pair of opposite sides (30, 31) of each of said chain links, said rib members member-~~(50) being adapted to engage a ~~the~~ groove (56) on said coupling member (18).

45. An apparatus ~~A chain~~ according to claim 35, characterized in that each chain link (12) has a length different from an even fraction of a circle having the radius of said helical winding.

46. An apparatus ~~A chain~~ according to claim 45, characterized in that the length of each chain link (12) constitutes an odd fraction of said ~~a~~ circle.

47. An apparatus according to claim 46, characterized in that the length of each chain link (12) constitutes a fifth of a ~~the~~ peripheral length of an ~~the~~ interior wall ~~side~~ of the winding guide ~~means~~ (14).

48. An apparatus ~~A chain~~ according to claim 35, characterized in that the chain links (12) are molded from a plastics material.

49. An apparatus ~~A chain~~ according to claim 35, characterized in that the chain links (12) are made as cast or sintered metal bodies.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory J. Strimbu whose telephone number is 571-272-6836. The examiner can normally be reached on Monday through Friday 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Chilcot can be reached on 571-272-6777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Gregory J. Strimbu', with a long horizontal flourish extending to the right.

Gregory J. Strimbu  
Primary Examiner  
Art Unit 3634  
March 7, 2006